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THE TREATMENT OF BURNS.

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It is strange that with the almost universal application of aseptic and antiseptic measures to other classes of injury, burns and scalds are still largely subjected to treatment by methods long antedating the Listerian doctrine. Nevertheless, these principles are easily applicable to most cases of injury by heat and the results obtained are generally as satisfactory, when compared with those derived from older methods, as are the effects of asepsis in other injuries. In what follows it will be my endeavor to point out a method by which these ends can be satisfactorily secured.

Burns and scalds if of any considerable area are attended by much shock and very low temperature. The paradoxical complaint of those severely burned is of intense cold. This is often, but not always, accompanied by agonizing pain. This shock should be relieved by the usual warm external applications and by the hypodermatic administration of such agents as atropia, digitalis, and brandy. Pain in this stage can best be relieved by subcutaneous doses of morphia; particularly should this agent be freely given in those cases where the burns extend over more than two-thirds of the body and death can be postponed but a few hours. In certain cases, after reaction from shock is complete, and pain remains severe, it is well to induce full anesthesia while a thorough primary dressing is applied to all the injured parts. While under the anesthetic the patient must be kept as warm as possible and but a single part exposed for dressing

presented by the author

at a time. In fact, this should ever be a rule in treating large denuded areas, that chilling and internal congestions from the very rapid radiation of heat which takes place from such raw surfaces may be avoided.

For the pain of less severe burns nothing is so efficient as dusting the parts thickly with bicarbonate of soda and upon this applying a plain gauze dressing wrung out of warm water. To preserve the required moisture of this dressing rubber or gutta-percha tissue should be bound upon the outside. This dressing should be left on but a few hours or a day at the outside, when it should be replaced by some application which will render the parts sterile and maintain them as nearly as possible in that condition. Or, if it is desired to at once proceed with the final dressing, a strong solution of the soda may be applied by immersion of the parts, or placing upon them of mops of absorbent cotton wrung out of the solution. Application by the same means of two per cent. solution of cocain also answers this purpose very well. It is, however, but rarely necessary to apply either the soda or cocain as most burns when they reach the surgeon have passed the acutely painful stage, or have assumed an angry suppurative condition from home treatment. In these latter cases, as well as in all where the pain is not very acute, the carbolic bath to be mentioned in connection with the dressing will exert ample analgesic effect to produce comfort.

When pain has moderated and shock has disappeared, the following is my customary procedure. All detached fragments of skin or other tissue are carefully dissected away, and the covering of any blebs is likewise removed. The parts are then immersed or bathed for ten minutes in a two and a half per cent. solution of carbolic acid. This accomplishes a double purpose: the burn and its surroundings are thoroughly sterilized and the exposed or irritated nerve ends are benumbed into comparative insensibility. The carbolic solution has the additional advantage of sterilizing any fatty matters that may be upon the skin and extends its antiseptic action down into the sudoriparous and fat glands. If any portions of clothing or other material adhere firmly

to the burned surfaces it is well to allow them to remain until thrown off upon the dressings. The soaking in carbolic solution will render all such sterile.

The injured regions are next subjected to a spray of full strength peroxide of hydrogen solution. This, with all detritus arising from its action, is washed away with salt solution (one drachm of common salt to the pint of water). The parts are now covered in completely with strips of Lister protective, which should extend for half an inch upon sound skin in all directions. If extensive areas are to be thus covered and expense is an object, gutta-percha tissue may be substituted for the Lister silk protective, but the latter is far superior. Either of these protectives should be immersed for some moments in the carbolic acid solution before application. A copious dressing of sterilized gauze should next be neatly applied so as to well overlap the edges of the protective strips and over this a thin layer of absorbent cotton is bound with moderate compression. If the burns have become very septic it is well to apply the gauze wrung out of 1-4000 bichloride solution and cover the dressing in with rubber or gutta-percha tissue to retain it in a moist condition. In either case the dressings should be renewed not later than every second day. Sometimes daily dressing of an originally very septic burn will be necessary.

Thorough spraying with the peroxide of hydrogen solution (diluted if its full strength application gives rise to pain) washing with salt solution, reapplication of the protective strips, gauze, and cotton, constitute the necessary steps in redressing until cicatrization is complete or the surfaces are granulating and ready for skin grafting. Bathing with the carbolic or 1-2000 bichloride solution may also be necessary until asepsis is perfect. Any sloughs that may form in the process of healing are apt to separate very slowly under antiseptic conditions, but their removal may be hastened by dissecting them out (cutting a little within the edges of the slough to avoid pain and hemorrhage) or the sphacelus may be rapidly digested and liquefied by swabbing its surface

daily with glycerole of papain immediately before applying the protective slips.

Under the dressing above described healing almost invariably progresses without pain, odor, excessive contraction or hemorrhage, and the development of complications such as suppurating glands, cellulitis, erysipelas or tetanus have become all but unknown. If extensive surfaces are involved, the patient is not exhausted by pain and excessive suppuration; fever is absent, septicemia does not supervene and the kidneys and other internal organs are not subject to so great an extent to that tendency to inflammation or congestion which is so characteristic of extensive septic burns. Reparative materials are largely conserved; newly formed epithelial and other cells are not torn away at each dressing and the organizing tissues are kept in a condition of asepsis with moderate moisture which is so essential to rapid healing; without excessive production of that fibrous cicatricial material which is responsible for the disfiguring and often disabling contractions which have been such constant sequels of burns.

Contraction is then much less extensive when burns have been treated antiseptically, but very large denuded areas in the neighborhood of joints, the neck, breast or small surfaces near the mouth or eyes are still liable to produce sufficient contraction to be undesirable. Much the same line of treatment is to be maintained until the entire surface is covered by healthy granulations, and epithelium has commenced to form on it. If then it becomes apparent that undesirable contraction will be inevitable, if the natural process of healing is permitted to continue, Theirsch's operation of skin grafting must early be resorted to and the denuded surface covered in as much as possible with new skin. Fortunately in this procedure we have an addition to the means of treating burns by which in many cases the horrible results of contraction can be entirely or partially obviated.

Where burns are situated near or in the flexures of joints, whether grafting is resorted to or not, splints should be

applied to resist the tendency of the parts to assume a flexed position during healing. When several fingers or toes are burned each one should be dressed separately, that the cicatrizing surfaces may not come in contact and permit two or more of the digits to grow fast together; here grafting is often of great utility.

In burns or scalds about the genitalia, nates and portions of the face or ears the protective and gauze dressing cannot always be well applied or kept in position. If it slips and permits the parts to become dry or adherent to the gauze or bandages more harm than good will result. In these regions we may be forced to rely upon some form of ointment. But even under these circumstances, washing with carbolic or salt solution and spraying with the peroxide solution, with frequent change of dressings will maintain the parts in a state of very fair disinfection and largely abate odor, supuration and fibrous cicatrization. The preparation that has given me the most satisfaction for this purpose is the benzoated oxide of zinc ointment spread thickly upon lint, dusted with iodoform or aristol and bound on with the usual thin layer of absorbent cotton. Or a mask of the spread and dusted ointment can be cut and simply laid upon the face with openings for the mouth, nose and eyes. Of the two dusting powders mentioned aristol is much to be preferred because of its more active antiseptic and anesthetic powers as well as its lack of odor.

In general burns, an air or water bed is almost essential for the comfort of the sufferer; it also prevents pressure upon denuded parts and the formation of bedsores.

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